

AD-A240 440



2

**AirLand Battle Future Division Reconnaissance
A Complex Solution To A Simple Problem**

**A Monograph
by
Major Christopher L. Baggott
Armor**



**DTIC
SELECTED
SEP 13 1991
S B D**

**School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas**

First Term AY 90-91

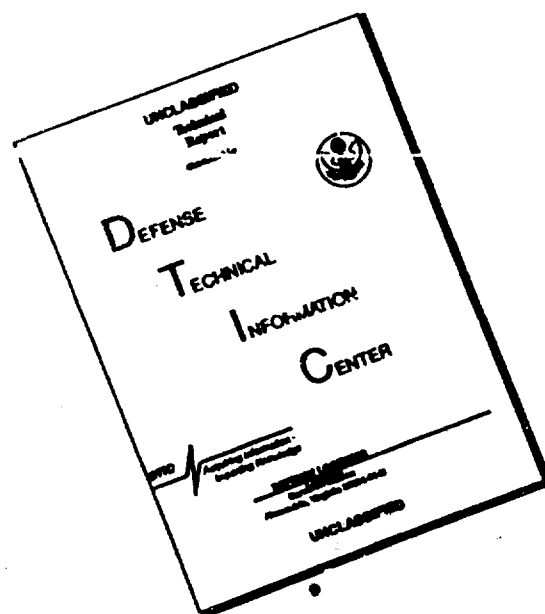
Approved for Public Release; Distribution is Unlimited

91-10431



91 9 12 048

DISCLAIMER NOTICE



THIS DOCUMENT IS BEST
QUALITY AVAILABLE. THE COPY
FURNISHED TO DTIC CONTAINED
A SIGNIFICANT NUMBER OF
PAGES WHICH DO NOT
REPRODUCE LEGIBLY.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION <i>UNCLASSIFIED</i>			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION / AVAILABILITY OF REPORT <i>Approved for public release; distribution unlimited</i>		
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
4. PERFORMING ORGANIZATION REPORT NUMBER(S)			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
6a. NAME OF PERFORMING ORGANIZATION <i>School of Advanced Military Studies, USAC&GSC</i>		6b. OFFICE SYMBOL (if applicable) <i>ATZL-SWV</i>		7a. NAME OF MONITORING ORGANIZATION	
6c. ADDRESS (City, State, and ZIP Code) <i>Fort Leavenworth, Kansas 66027-6900</i>				7b. ADDRESS (City, State, and ZIP Code)	
8a. NAME OF FUNDING / SPONSORING ORGANIZATION		8b. OFFICE SYMBOL (if applicable)		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
8c. ADDRESS (City, State, and ZIP Code)				10. SOURCE OF FUNDING NUMBERS	
		PROGRAM ELEMENT NO.		PROJECT NO.	TASK NO.
				WORK UNIT ACCESSION NO.	
11. TITLE (Include Security Classification) <i>Airland Battle Future Division Reconnaissance - A Complex Solution to a Simple Problem</i>					
12. PERSONAL AUTHOR(S) <i>Major Christopher L. Baggott USA</i>					
13a. TYPE OF REPORT <i>Monograph</i>		13b. TIME COVERED FROM _____ TO _____		14. DATE OF REPORT (Year, Month, Day) <i>90/12/15</i>	
				15. PAGE COUNT <i>56</i>	
16. SUPPLEMENTARY NOTATION					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP			
			<i>Principles of War Combined Arms training</i>		
			<i>Airland Battle Future Tactical Maneuver</i>		
			<i>Reconnaissance</i>		
19. ABSTRACT (Continue on reverse if necessary and identify by block number) <i>SEE ATTACHED SHEET</i>					
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED / UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION <i>UNCLASSIFIED</i>		
22a. NAME OF RESPONSIBLE INDIVIDUAL <i>MAJ Christopher L. Baggott</i>			22b. TELEPHONE (Include Area Code) <i>913-727-1550</i>		22c. OFFICE SYMBOL <i>ATZL-SWV</i>

SCHOOL OF ADVANCED MILITARY STUDIES

MONOGRAPH APPROVAL

Major Christopher L. Baggott

Title of Monograph: AirLand Battle Future Division:
Reconnaissance-A Complex Solution
to a Simple Problem

Approved by:

Ricky an. Rowlett Monograph Director
Lieutenant Colonel Ricky Rowlett

Gordon F. Atcheson Director, School of
Colonel Gordon F. Atcheson, MA Advanced Military
Studies

Philip J. Brookes Director, Graduate
Philip J. Brookes, Ph.D. Degree Program

Accepted this 9th day of April 1991

ABSTRACT

AIRLAND BATTLE FUTURE DIVISION RECONNAISSANCE-A COMPLEX
SOLUTION TO A SIMPLE PROBLEM. By MAJ Christopher
L. Baggott, USA, 56 pages.

This monograph analyses both the organization and the mission of AirLand Battle Future (ALBF) division-level reconnaissance forces. Specifically evaluated is the proposed ALBF division cavalry squadron and the attack/reconnaissance (aviation) battalion. The purpose of this study is to determine if the ALBF functional separation of the division reconnaissance mission between the division cavalry squadron and the aviation battalion is either practical or an efficient utilization of resources.

This study begins with a description of fundamental reconnaissance theory and doctrine and continues with an historical examination of the military integration of U.S. air and ground reconnaissance forces. Next, it examines the current "J" series division cavalry squadron and defines both organizational capabilities and limitations. A discussion of the anticipated ALBF battlefield environment coupled with the perceived role of division reconnaissance formations provides a point of departure for further analytical examination and ultimately, design recommendations. The ALBF reconnaissance design is appraised using as evaluation criteria the selected principles of war of unity of command, economy of force, and simplicity.

Although the predicted intensity of nonlinear ALBF combat may necessitate the modification or restructuring of assorted tactical maneuver forces, this study concludes that it is neither a productive nor an efficient utilization of resources to separate the division reconnaissance mission between two organizations. Furthermore, it recommends that reconnaissance success is achieved by combined arms training and a thorough understanding of systems capabilities and limitations and not by the creation of an impractical and unnecessary additional battalion-level headquarters.



Accession For	
NTIS DATA	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Final Action Codes	
Mark and/or	
Dist	Special
A-1	

TABLE OF CONTENTS

	Page
Section I. Introduction	1
Section II. Reconnaissance Theory.	4
Section III. Historical Perspective	6
Section IV. Current Force Structure.	12
Section V. ALBF Concept	15
Section VI. ALBF Division Reconnaissance . .	22
Section VII. Armor and Aviation Proponent Recommendations.	25
Section VIII. Analysis	27
Unity of Command	29
Economy of Force	32
Simplicity	35
Section IX. Conclusions.	40
Annexes:	
A. Cavalry Squadron - 1963 (TO&E).	43
B. Cavalry Squadron - "J" Series	45
C. Cavalry Squadron - ALBF	46
D. Aviation Battalion - ALBF	47
Endnotes	48
Bibliography	52

Know your enemy and know your yourself; and in one hundred battles your will never be in peril. When you are ignorant of the enemy but know yourself, your chances of winning and losing are equal. If ignorant both of your enemy and of yourself, you are certain in every battle to be in peril.

Sun Tzu: The Art of War

Information is the foundation of battle, and battle is the main tactical action which takes places between armies. . . . From what I have said about aircraft, it will be realized that reconnaissance on the ground will have to be as unceasing as in the air, and that these two forms of reconnaissance are interdependent.

J.F.C. Fuller: Armored Warfare

I. INTRODUCTION

From the birth of armed conflict thousands of years ago until the present, successful battlefield commanders have realized the importance of having accurate and credible enemy intelligence. Typically, ancient battle was a relatively short, yet extremely violent affair. Often, success was secured by using the information acquired through the reconnaissance of an adversary's location and disposition. Time has not diminished the commander's reliance on skillful battlefield reconnaissance and information gathering. In fact, as the environment of modern warfare becomes more lethal and battlefields more extensive due to the application of improved technology, the impact of effective reconnaissance to assist the commander in shaping the battlefield will increase in significance.

The influence of technological innovation as a major actor on the contemporary battlefield cannot be overemphasized. Competition in weapons technology and the associated systems effects have been so rapid and

continuous that scientists have become as important in warfare as politicians or soldiers.³ Technology, besides its obvious casualty-producing effects, has provided the modern commander the ability to conduct continuous operations and has, in fact, created a third battlefield dimension (airspace). The development of the airplane and airpower brought revolutionary significance for military strategy and the conduct of war. Distances and limited observation are no longer serious warfighting obstacles. These improved weapon systems and their influence combined to create greater dispersion in military formations. Battlefield geometry changes, coupled with the increased lethality afforded by technological advancements, have transformed the environment of war. Yet, despite systems improvements, the tactical commander continues to rely on his reconnaissance soldiers to see the depth of the battlefield.

From the moment that the Wright brother's flew their first aircraft at Kitty Hawk in 1903, the military has embraced the concept of the use of aviation as a battlefield combat multiplier. By 1910, two years after the Wright brothers had demonstrated their aircraft before military audiences in the US and Europe, there was growing recognition that the airplane would revolutionize reconnaissance.⁴ The introduction of helicopters, airborne sensors, and surveillance equipment has made systematic observation and information collection more reliable and responsive to the tactical commander. The question concerning which tactical reconnaissance formation can best

facilitate the advantages provided by contemporary surveillance tools and forces is as significant today as it was in the time of Orville and Wilbur Wright.

Due to the fluctuating world political climate and military balance of power, coupled with the impact of advanced systems technology on the battlefield, the Army Training and Doctrine Command (TRADOC) and the various branch proponent schools are considering alternative designs and warfighting techniques. A new concept, coined AirLand Battle Future (ALBF), focuses on the employment of the Army as the principal land component of U.S. military power in the 21st Century.

One of the numerous proposed ALBF design changes to the current heavy division force structure is the movement of air reconnaissance assets (helicopters) from the cavalry squadron into a newly designed aviation and reconnaissance battalion.⁵ Conceptually, this plan would create a functional split of the division-level reconnaissance mission between two distinct organizations. By ALBF design, the cavalry squadron would be responsible exclusively for ground reconnaissance, while the aviation battalion focus would be on aerial reconnaissance. The purpose of this monograph is to determine if the proposed ALBF separation of the heavy division's air and ground reconnaissance forces will create command and control problems for the division commander and his staff.

In the development of this paper I intend to cite specific historical examples that demonstrate the military significance of the integration of air and ground reconnaissance systems. These historical

examples provide insights in terms of command and control challenges, mission design, limitations and capabilities. The scope of this paper is limited primarily to the study of U.S. formations and experiences at the high to mid-intensity conflict range.

The conceptual ALBF environment is introduced to describe expected systems capabilities and to demonstrate anticipated battlefield dimensions. A summary of both the proposed ALBF cavalry squadron and the aviation/reconnaissance battalion will identify expected organizational capabilities and limitations. Finally, the selected principles of war of unity of command, economy of force, and simplicity are used to analyze the proposed ALBF division-level reconnaissance design with the current "J" series organization.

II. RECONNAISSANCE THEORY

The purpose of reconnaissance is to "gather information on which commanders can base plans, decisions, and orders. Reconnaissance is surveillance; that is, systematic observation by any means."⁶ The significance of this definition is fundamental to the conduct of maneuver warfare. The value and importance of gathering information about an adversary was a vital feature in Sun Tzu's evaluation of the successful commander.⁷ Antoine Henri Jomini stressed that it was of the "highest importance" to gain information of the enemy's disposition and summarized:

A general should neglect no means of gaining information of the enemy's movements. For this purpose he should make use of reconnaissances, spies, bodies of light troops commanded by capable officers....ever multiply the means of obtaining

information, for no matter how imperfect and contradictory they may be, the truth may often be sifted from them.

The information obtained through the coordinated use of available reconnaissance assets often becomes a "combat multiplier" and allows the commander both time and space to position his maneuver forces in the most advantageous and efficient manner. This concept is not new; rather, it is as old as warfare itself. Martin Van Creveld describes the perfect command system as having the ability of discerning reconnaissance information quickly and accurately:

An ideal command system, then should be able to gather information accurately, continuously, comprehensively, selectively, and fast. Reliable means must be developed to distinguish the true from the false, the relevant from the irrelevant, the material from the immaterial.'

However, Clausewitz warned that an over-dependence on information-gathering means may render command and control dysfunctional since "many intelligence reports in war are contradictory; even more are false and most are uncertain."¹⁰

The technological advance that has revolutionized the reconnaissance function in the heavy division is the helicopter. Its mobility, speed, and maneuverability offer the commander a system that increases both the tempo and depth of operations. Difficulty results, however, as you attempt to define the most efficient or advantageous ground and air reconnaissance command and control relationship for the ALBF heavy division. Historical examples provide some clues as to this ideal connection.

III. HISTORICAL PERSPECTIVE

The coupling of military ground and air assets to conduct battlefield reconnaissance actions was its beginning during the Italian-Turkish war in 1910. Italian aviators flew both reconnaissance and strike missions against Turkish positions.¹¹ When possible, visual flag signals were the primary means of communications between air and ground forces. Needless to say, communication techniques were crude and aeronautical equipment was unreliable. Nevertheless, there was growing recognition that the coordination of ground and air assets would reform surveillance techniques.

Pre-WWI military doctrine stressed the importance of the airplane for information collection. As technology improved and the aerial weapon platform became more reliable, there evolved a third dimension of the battlefield and a multi-mission perspective. Soon after the airplane appeared in combat for reconnaissance, it was modified for a more offensive role (i.e., tactical bombing).¹² Despite improvements, critical problems continued in communications and identification. BG Billy Mitchell reflected on his experiences during WWI:

We were experiencing a great deal of trouble with the ground troops in making them answer the signals from the air and properly man their radio stations for communicating with our airplanes. Our pilots had to fly right down and almost shake hands with the infantry on the ground to find out where they were...As a result,¹³ there was no communication at the critical time.

There were some encouraging signs of progress during the period, including efforts by the British to familiarize air and armor officers with each others specialty by assigning "tankers" to air duty and pilots

to armor units.¹⁴ Despite unreliable equipment and misunderstanding of weapon systems employment, the marriage of ground and air forces to conduct reconnaissance had arrived.

The inter-war period brought developments in both reconnaissance equipment and associated tactics, techniques, and procedures. The success of aerial reconnaissance assets working in concert with ground maneuver forces during WWI gained momentum and fostered considerable intellectual debate after the war. Giulio Douhet and his disciples advocated the development of the independent air force and stressed the strategic significance of airpower.¹⁵ Others, like General von Seeckt (German Army Commander-in-Chief prior to WWI), perhaps more realistic than Douhet in scope, believed it essential to integrate airpower as an equal member in the combined arms team.

The aviator has come to the aid, not to replace the cavalry. Close reconnaissance is left to the cavalry whose vision is not dimmed by clouded skies. In combination with airplanes, squadrons of cavalry find new employment.

In fact, WWII German aerial doctrine and practice was to create special liaison and control teams with ground maneuver headquarters in order to avoid confusion and to nourish air-army cooperation.¹⁷

Distinguished military leaders, such as MAJ (later General) I.D. White in 1931, promoted and advanced the concept of combining the operations of U.S. ground and air reconnaissance units. He stressed that air service missions were integral to successful ground maneuver warfare. White went so far as to recommend assigning airplanes to the division's

reconnaissance battalion.¹⁸ Acting as an observer with the British Army in North Africa prior to the entry of the United States in WWII, MG C. L. Scott believed that it was crucial to employ the long-distance reconnaissance capability afforded by the airplane with the close-in security and reconnaissance of ground maneuver forces:

The lack of air reconnaissance working constantly with ground reconnaissance tied in on the same communication net and the lack of sufficient ground reconnaissance to throw out both long distance elements as well as intermediate patrols led to many surprise actions in the last Middle East Campaign....If we do not insist on having air support in reconnaissance and combat, and if we fail to tie our ground units into the picture with these air units, understand the use of air, talk the same language, and train together, then we shall have overlooked the most important teamwork that modern means affords us.

The functional relationship between air and ground reconnaissance units continued to advance during WWII. The interacting teamwork of American forces that brought victory on the battlefield was readily apparent at St. Lo in 1944. Here, lead armored forces fitted with two-way radio sets were able to achieve instantaneous communications with aerial forces. Additionally, qualified pilots moved with lead tank columns and coordinated the air reconnaissance effort.²⁰ Perhaps MAJ D.H. Cowles best described the evolution of air-ground cooperation during WWII when he stated, "Success in battle can be assured only when there is complete cooperation of all arms."²¹

The evolution of aviation progressed towards a more significant combat role and equal, in terms of military worth, to ground maneuver forces. Technological improvements escalated aviation lethality and

increased battlefield depth. The creation of the independent Air Force in 1947 did not necessarily impair existing air/ground cooperation; rather, it may have established the conditions for less future teamwork and the possible creation of an air/ground reconnaissance void. Air Force employment considerations for fast moving, high performance aircraft were (and continues to be) directed primarily at either offensive or defensive air operations and not necessarily towards reconnaissance. The development of rotary-wing aircraft helped to solve this perceived reconnaissance dilemma.

Although Leonardo da Vinci drew a design for a flying machine he called a "Helixpteron" (Greek for "spiral wing"), Igor I. Sikorsky developed the first functional helicopter in 1939.²² American military use of the helicopter during the Korean conflict was generally restricted to medical evacuation and as an instrument to aid command and control. It was not until 1950 during an era of weapon and organizational revolution, that the Army tested the concept and studied the use of armed helicopters in cavalry units.²³

As a part of the army maneuver exercise, "Operation Sagebrush," during the winter of 1955-56, tests were made of an organization called "Sky Cav."²⁴ The "Sky Cav" unit consisted of light tanks, reinforced infantry, and helicopters. The operational link of helicopters and ground elements in the same organization to conduct reconnaissance and to collect combat intelligence began during the "Sky Cav" maneuvers. Within the next two years, the Army authorized the first air reconnaissance troops (Troops A and B, 17th

Cavalry) assigned to the 101st and 82nd Airborne Divisions, respectively.²⁵

In 1962, Secretary of Defense Robert S. McNamara directed a panel of aviation and cavalry experts to devise methods to replace conventional ground transportation with aircraft.²⁶ The panel, headed by LTG Hamilton H. Howze (then commander of the XVIII Airborne Corps) was formally known as the Army Tactical Mobility Requirements Board, but best remembered as the "Howze Board." LTG Howze took the instructions of Secretary McNamara one step further. He directed the panel to consider and recommend advanced airmobile methodology and techniques to capitalize on the mobility gained through the use of helicopters.²⁷ The Howze Board developed and designed both airmobile and air cavalry units with emphasis on the "application of Army aircraft to the traditional role of cavalry in the exploitation, pursuit, counterattack, delay, and flank protection."²⁸ The study recommended the formation of the 11th Air Assault Division (later to become the 1st Cavalry Division (Airmobile)) and the tactical integration of both aviation and ground elements in the divisional cavalry squadrons.

In 1963, under the ROAD (Reorganization of the Army Divisions) concept, army divisions were reorganized. An air cavalry troop (equipped with 26 helicopters) was now authorized in the armored cavalry squadron of the motorized division. (See Annex A-1963 TO&E).²⁹ The mission of the air cavalry troop was to act as an operational extension, by aerial means, of the squadron's reconnaissance and security capabilities.³⁰

This squadron organization received its baptism by fire during the Vietnam conflict.

In August 1966, then Army Chief-of-Staff GEN H. K. Johnson, initiated the Mechanized and Armor Combat Operations in Vietnam (MACOV) study under the direction of MG Arthur L. West. By March, 1967, a group of over 100 American Army officers and civilian analysts examined the combat record of armored and mechanized forces in Vietnam. In one of several recommendations, the group concluded that the coordinated use of both air and ground cavalry units was indispensable for effective reconnaissance.³¹ Furthermore, the group recommended the standardization of future armored and cavalry forces (equipped with helicopters) sent to Vietnam.

As enemy air defense systems became more refined by the later part of the Vietnam war, synchronization of air and ground reconnaissance became even more crucial. Ground maneuver forces often protected aerial assets, while aviation elements provided early warning, target acquisition, and fire support for the ground component. The preservation of either force required an organized effort. GEN Donn Starry (commander of the 11th Armored Cavalry Regiment in Vietnam, 1969-1970) expressed this relationship best:

The scouting mission-reconnaissance-is still critical. Air cavalry adds a new dimension to reconnaissance, one complementary to reconnaissance by ground scouts in armored cavalry units....The air cavalry-ground combination can give a much needed advantage to the force commander who uses it wisely.³²

The Vietnam era organization and structure of the

division cavalry squadron remained virtually unchanged until 1984. Throughout the period, the unit received both newly-designed and product-improved equipment. The infantry squad was deleted from the cavalry platoon as was the aerorifle (aerorecon) platoon from the air cavalry troop.³³ Despite these minor organizational changes in the squadron, the cavalry's primary mission of reconnaissance and security remained unchanged. One positive result of the Vietnam conflict was the realization by the U.S. military leadership of the requirement for an integrated air and ground maneuver force conducting reconnaissance operations.

IV. CURRENT FORCE STRUCTURE

In 1980, under the "Division 86" restructuring plan (modified slightly under the 1984 Army of Excellence (AOE) plan), the Division Cavalry Squadron was reorganized once again (see Annex B). The intent of this restructuring effort was to define and develop a remodeled mounted division and to "institutionalize a process to conduct periodic force reviews and design the needed changes of major division components."³⁴ Specifically, in the division cavalry squadron, tanks and scout APCs were deleted from the structure and the M3, Cavalry Fighting Vehicle, was issued to ground troops. Although, the number of assigned air frames remained virtually unchanged, they were now divided between two air cavalry troops. This new organization's mission focus emphasized the concept of reconnaissance by stealth.

A technological transition period that replaced

obsolete equipment with more capable systems justified these substantial changes. The new squadron's equipment authorization reflected a more prevalent information-gathering role. The combination of organizational and systems changes generally decreased the unit's direct fire potential (deletion of tanks), but increased its reconnaissance and surveillance capabilities (addition of the Bradley Fighting Vehicle and an air cavalry troop). Also, as a result of this new force structure, was the maturation of a more active air/ground tactical relationship and the requirement for the mutual cooperation of ground and air assets to obtain intelligence. This characteristic portrayed the overriding theme for the new organization:

In order to win on the modern battlefield, division commanders' decisions must be quick, correct, and rapidly disseminated. The reconnaissance and surveillance systems of modern cavalry must be capable of collecting and reporting critical information faster and more accurately than ever before.

The removal of the tanks from the squadron caused an immediate uproar from those who championed the doctrine of the "fighting cavalryman." The squadron, because of its lack of organic firepower, now was capable of only limited self-protection and was unable to conduct most economy of force missions. Despite equipment changes, doctrine remained the same. The squadron continued to perform the traditional "cavalry" tasks (ie., attack, defend, economy of force, etc) as well as security and reconnaissance operations. Others argued that tanks assigned to the cavalry may be counterproductive:

If we arm the scout as a fighter, he is likely to

become one. The obvious corollary is that if we provide the senior commander an armor-protected, tank-like force, it is likely to be used as one, and at that point the cavalry would cease to accomplish proper reconnaissance and security and become decisively engaged.

Regardless of the debate, the squadron continued to refine, integrate, and mold the combat potential of aviation and armor into one cohesive combined arms team. The unit is equipped and organized to aid the division commander to see the "breadth" of the battlefield. In order to accomplish this mission, the squadron commander must array his assets in the most efficient manner to capitalize on enhanced mobility systems. To be effective, the squadron commander must know reconnaissance systems limitations and capabilities. MG George S. Patton Jr (Commandant of the U.S. Army Armor Center, 1977-79) stated categorically that the "air cavalry troop is the aerial counterpart of the ground cavalry troop," and that "with reference to our scouts, be they ground or airborne, we must be careful not to overarm them, always remembering that they are principally scouts, not killers."³⁷ Regardless of the arguments presented against the new force design, the "Division 86" cavalry squadron furnished the Army with a combined arms reconnaissance and surveillance force strengthened by the benefits provided by contemporary science and technology.

The attempt to combine the lessons of history with the capabilities of technology in order to determine an appropriate doctrine and force structure is not new. Historical examples of the marriage of technology with tactics are numerous. The nation able to correctly

interpret the impact of the combination of the two, quite often will achieve battlefield success.

V. ALBF CONCEPT

ALBF is an evolutionary process designed to modernize the current military doctrine of AirLand Battle (ALB). Simply stated, ALBF attempts to predict the effects of emerging battlefield technology, anticipated fiscal and political constraints, and the changed nature of the perceived threat (Central Europe) and identifies likely operational, tactical, and doctrinal options.³⁸

The most recent U.S. force design decisions ("J" series, and "Army of Excellence-A.O.E." force structure strategies) oriented towards the possibility of a NATO-Warsaw Pact confrontation. As tensions ease in Europe and the likelihood of conflict in this specific operational theater declines, military and political emphasis will most likely shift towards other potential conflict regions. ALBF attempts to coordinate the effects of improved systems with force design as impacted by the dynamics of a changing threat.

Evolutionary changes in the global environment necessitate the reshaping of military requirements. Present Army warfighting doctrine, outlined in the current (1986) version of FM 100-5, Operations, characterizes military operations to be either linear or non-linear and focused potentially throughout the spectrum of conflict (low to high intensity).³⁹ Over time, however, the application of ALB doctrine has centered principally on and been influenced by NATO and/or

alliance guidelines and has produced a linear mind set, especially at the operational level of war.⁴⁰

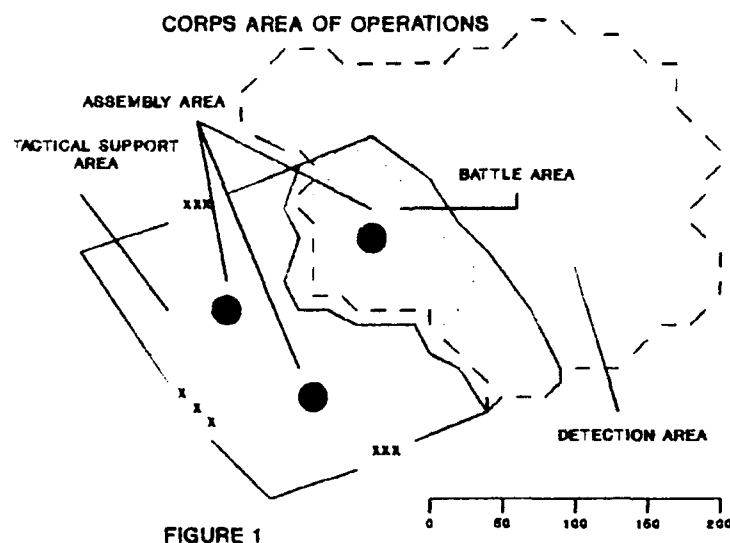
Yet, there is an important and fine difference between ALB and ALBF. ALB doctrine visualizes linear warfare that becomes nonlinear when opposing forces are intermingled. ALBF, on the other hand, describes an initial nonlinear friendly force array. Nonlinearity implies that prior to combat, forces are dispersed and not "locked into a line of contact; they are able to move and mass combat power quickly, fight violent short battles to destroy the enemy and then disperse to fight again."⁴¹

Traditionally, the focus of U.S. military (ALB) doctrine was the defeat of the Warsaw Pact fought on a linear battlefield. ALBF, on the other hand, attempts to address all possible contingencies:

The ALBF concept recognizes that our national military strategy will remain essentially the same; however, emphasis will shift from a predominantly European focus to a globally deployable contingency posture. We must maintain the capability to fight the big war. . . The Army's shift in emphasis will be towards forward presence, reinforcing, contingency, unique mission, and nation assistance missions.

During ALBF operations, the corps is the primary combat force in a theater of war and will be assigned an area of operations by the higher level commander. Dimensionally, this area of operations can be as large as 450 kilometers in depth and 300 kilometers in width. This geometric area is not fixed; rather it is shaped situationally and in accordance with the factors of METT-T.⁴² The threat of massed enemy indirect fires and the attempt to reduce friendly electronic signatures require the wide dispersal of forces.

Maneuver units mass to destroy enemy forces. The principal mission focus is the destruction of the enemy and not the retention of terrain. Division of the ALBF corps area of operations is in three tactical zones (See Figure 1).⁴⁴



The corps commander develops and gathers current information and anticipates enemy activities in the Detection Area. Destruction of the enemy through the utilization of all available corps combat assets occurs in the Battle Area. Regeneration and reconstitution of combat power occurs in the Tactical Support Area. Habitually, the Tactical Support Area is positioned outside the range of enemy indirect fires.⁴⁵

ALBF visualizes nonlinear combat to occur in four continuous and interdependent stages or phases: (I) detection and verification of enemy forces (Detection Zone), (II) destructive fire by indirect fires and other assets (Battle Area), (III) maneuver to complete

the destruction of the enemy (Battle Area), and (IV) recovery and regeneration (Tactical Support Area).⁴⁶

ALBF Stage I (Sensors/Acquisition) operations focus at the early detection, identification and targeting of enemy forces in the Detection Area.⁴⁷ This action is primarily conducted by theater and corps intelligence sensors and target acquisition systems. Organic HUMINT assets (Armored Cavalry Regiment or Aviation Cavalry Regiment) will confirm sensor findings. The creation of redundant intelligence gathering systems decreases uncertainty and assures effectiveness. These systems possess both an all-weather and 24-hour collection capability. Successful Stage I operations provide the corps commander sufficient time and space to position forces to best facilitate the destruction of the enemy.

Stage II (Fires) operations orient on the defeat of enemy forces throughout the depth of the battlefield utilizing all available indirect fire assets. These systems include artillery (both Army and Navy), Army and Air Force aviation, and electronic warfare assets. Following the execution of deep fires, forward maneuver forces continue the destruction of enemy formations while avoiding attrition battles. Successful Stage II operations destroy enemy forces, shape the battlefield for subsequent tactical maneuver and "segregate and separate primary enemy formations in time and/or space."⁴⁸

During Stage III (Maneuver) operations, tactical units complete the destruction of the enemy. As necessary, dispersed maneuver forces mass and focus at heavily attrited enemy formations. The corps

commander "tailors" his available forces (divisions and brigades) to provide sufficient combat power at the critical point of battle. Force alignment and mission design are directed solely at the complete annihilation and pursuit of the enemy. Maneuver operations of this magnitude require agility, flexibility, initiative and enhanced-mobility weapon platforms.⁴⁹

Division synchronization efforts and command post functions are significantly reduced on the ALBF battlefield. The division will fight only the close battle and will have no requirement to fight or plan either a rear or deep fight. The corps commander will "tailor" or task organize the division with sufficient combat, combat support, and combat service support assets to conduct the immediate close battle. Division commanders will coordinate close operations only, collect and process tactical information, and maneuver subordinate brigades. Only emergency logistics and resupply items will be available. The division will be capable of executing and sustaining operations for a maximum of 24 hours. Beyond this time period, the unit will either have completed its offensive mission or have been relieved.

During Stage IV (Recovery), units reconstitute and regenerate. The primary goal of this phase is to increase the combat potential of the maneuver commander through sustainment and logistical actions. Successful recovery operations will require a proactive, robust and continuous combat service support organization. The ability of the corps commander to conduct combat operations beyond the first day of battle will often

result directly from the innate capability of the logistician to regenerate combat power.

Principally, consolidation of combat service support assets is at the corps level. The corps commander will task-organize his logistics assets to support division operations. By ALBF design, the division commander has a reduced sustainment effort responsibility. His primary ALBF battle focus is the close fight.⁵⁰

ALBF operational stages are not independent activities, nor do they occur in isolation of one another. Rather, actions in one stage will normally have a direct effect on one or more other stages. ALBF anticipates a continuous cycle of combat actions in the corps area. The corps commander may simultaneously maneuver forces to destroy enemy formations in the Battle Area, monitor follow-on forces moving in the Detection Area, and fight a rear area Level III threat in the Tactical Support Area. The ability of the ALBF corps commander to see the entire battlefield and react quickly to all potential threats will decide the difference between tactical victory or defeat.

Since offensive operations to destroy enemy formations is the principle focus of ALBF, success will be directly proportional to the ability of the intelligence community to correctly identify threat target arrays and process information in a timely manner. The integrated utilization of available information collection (HUMINT, SIGINT, ELINT) systems by the corps G2 will provide the corps commander both time and space to focus combat power.

The prerequisite for successful nonlinear, offensive

operations is accurate information. The extended dimensions of the corps area of operation require rapid and precise intelligence. The corps commander will provide sufficient combat and support assets to the division commander to fight only a known enemy force. The division commander will mass combat power, move and attack this enemy formation. The inability of corps intelligence to provide near perfect information that identifies all enemy units could very well result in a surprise meeting engagement while enroute to the primary target and the defeat of the friendly force.

As was previously stated, the missions of Stage I (Detection Area) and Stage II (Fires) are to set the conditions for battle. Once the corps commander decides where and when to destroy enemy formations, he will mass previously dispersed maneuver units. Self-contained, combined arms packages are task-organized in accordance with the factors of METT-T. Corps and division reconnaissance units perform continuous coordination and liaison. Initially, the corps armored cavalry regiment (ACR) confirms Detection Zone information by gaining contact with the enemy and, when necessary, conducting independent offensive actions or the full extent of security operations. By ALBF mission design though, in the Detection Zone the ACR will avoid decisive battle and focus principally at finding, verifying and targeting enemy forces.⁵¹

Upon the commitment of maneuver forces, divisional reconnaissance units will deploy and establish liaison with either the corps ACR or other committed forces

(situationally dependent), gain and maintain enemy contact, and develop the situation for the division commander. This operation is conducted either by the ALBF division cavalry squadron or the division aviation battalion.³² Both ground and air cavalry provide security and early warning and confirm intelligence.

VI. ALBF DIVISION RECONNAISSANCE

The cavalry squadron and the aviation battalion will conduct division-level reconnaissance missions on the ALBF battlefield. Dependent on the situation, the division commander will assign a specific task to either unit. The division G2 and G3 synchronize and coordinate intelligence-gathering systems. The division G-2's All Source Production Section (ASPS) is responsible for collection management. The ASPS synthesizes and analyzes obtained information (received either by sensors, acquisition, or reconnaissance means) and hopefully provides the commander an undistorted picture of the battlefield. With one notable exception, this aspect of division collection management is the same in both the contemporary or ALBF design. Currently, the ASPS receives reconnaissance information from one battalion-level organization equipped with both helicopters and ground scout vehicles. This same information will be transmitted from two separate reconnaissance units to the ASPS on the ALBF battlefield.

The proposed ALBF divisional cavalry squadron consists of a headquarters troop and three ground cavalry troops (see Annex C). Two platoons of tanks

and two platoons of scouts are assigned to each ground troop. No aviation equipment remains in the unit. Left is an aviation planning cell responsible for the integration of air cavalry or attack helicopters, as the situation may dictate.

The squadron remains the principal ground element of the division commander's reconnaissance, security and surveillance system. The mission of the squadron is to deploy early and establish contact with the enemy, develop the situation, protect the division, and shape the battlefield for follow-on tactical maneuver.⁵³

The squadron is logistically streamlined and, for only limited periods, can be self-sufficient. Eliminated from current structure authorization are the mess and organizational maintenance (Class I/IX) sections. Only limited Class III resupply and transportation assets are authorized. The bulk of logistical equipment and functions are relocated to the division support company under the ALBF logistical support concept.

The ALBF division aviation battalion has a headquarters company, three reconnaissance/attack companies and a service support company (see Annex D). Also authorized is an aviation planning cell assigned the mission of integrating additional aviation assets for the division. Aviation assets removed from the cavalry squadron and the division field artillery aerial observers are consolidated to form the nucleus of the reconnaissance/attack companies. The general support company primarily provides command and control aviation for the division headquarters. All other aviation

assets are consolidated at the corps-level and organized under the corps aviation command.

The ALBF aviation battalion provides the division only essential organic aviation support. The battalion mission focus is to conduct air reconnaissance, limited air attack, and to assist the division commander and staff in the integration of attack aviation assets received OPCON to the division from corps.⁵⁴ The size of the aviation staff section in both the aviation battalion and the division G3 section facilitates coordination, planning and integration of substantial aviation attack assets received from corps.

With the exception of a small class III/V platoon, aviation combat service support is consolidated at the corps level. The class III/V platoon provides limited support and requires augmentation for continuous operations. Only aviation crew-level operator maintenance is authorized. Corps aviation maintenance teams perform all needed repairs.

Since the focus of the division during ALBF combat is only the close battle, the division commander and his staff must manipulate the reconnaissance effort to support the immediate mission. The division will tailor reconnaissance assets in order to take full advantage of unique systems capabilities.⁵⁵ Aviation provides the commander an immediate response and agile reconnaissance platform. The aviation battalion can move deep and react at a moment's notice. Ground assets are effective during both limited visibility or continuous operations. Ground cavalry scouts are often able to verify or confirm intelligence at locations unsuita-

ble for aviation. When necessary, the cavalry squadron is capable of fighting for intelligence and has sufficient combat power to assist in division movement protection.

VII. ARMOR AND AVIATION PROPONENT RECOMMENDATIONS

Early in the development of the ALBF division-level reconnaissance design, it was speculated that the functional separation of the surveillance mission between ground and air commanders would create additional organizational and command and control obstacles. In response to this potential problem, the Combined Arms Command (Ft. Leavenworth) tasked both the Aviation and Armor Centers to reply and provide design recommendations as necessary.

The Aviation Center stated that there should be only one division-level reconnaissance unit and that:

What makes cavalry unique is its capability to work in a pure combined arms operation. To provide a force with the maximum reconnaissance and security capability, the air and ground troops must work together in every mission possible. To keep unity in effort, the cavalry must operate under one commander.

The Armor Center, on the other hand, provided a different solution to the question:

Two divisional cavalry organizations are preferred. By dividing each organization along ground/air functional lines, the ability of their respective organizational structures to exercise greater command and control is enhanced. A strong habitual association between the two organizations is vital.

In effect, the Aviation Center response indicates an acceptance of the current "J" series reconnaissance structure with equipment product improvements, while

the Armor Center reply proposes that the reconnaissance mission should be divided between air and ground elements. We must address why the Armor Center believes that changes in the current reconnaissance command and control relationship are necessary.

Periodically, the Armor Center will host a series of armor and cavalry conferences in order to obtain feedback and recommendations from the current field commanders. Division cavalry squadron commanders attended one such meeting in 1989. A significant concern expressed in this particular meeting was the formidable training challenge of integrating ground and air forces into a viable reconnaissance organization. Also discussed was the complexity of the unit and the difficulty in discerning both capabilities and limitations of reconnaissance system platforms.⁵⁶ Based on the reaction from this conference and from additional data obtained from the Armor community, the Armor Center's Directorate of Combat Development suggested that the Combined Arms Command design the division-level ALBF organization with separate air and ground reconnaissance units.

The proposed ALBF functional separation of the reconnaissance mission in the division force structure requires the division commander and staff to manage, coordinate, and tactically employ an additional surveillance and reconnaissance organization. The remainder of this paper will explore whether or not the ALBF force design proposal is the most effective and efficient method to direct division-level reconnaissance forces.

VIII. ANALYSIS

J.F.C. Fuller developed his principles of war during WWI as a guide for the British Army.⁵⁹ The U.S. Army soon adopted Fuller's principles, and, despite systematic study, they have changed little over time. According to Fuller, the principle of objective provides both military aim and purpose and is the fundamental building block on which the other eight principles depend.⁶⁰ The principles of war are not necessarily autonomous; rather, they tend to possess a dynamic and mutually dependent relationship with one another. Specifically, the principles of simplicity, unity of command, and economy of force have particular significance in the analysis of the proposed ALBF reconnaissance structure for the heavy division.

The principle of unity of command implies that the authority and responsibility for the execution of any military operation rest with one battlefield commander. The focus of unity of command is the mission and the task at hand. This does not imply command centralization; rather, unity of command and command decentralization are complementary functions. Unity of command facilitates "directing and coordinating the action of all forces toward a common goal or objective."⁶¹ The indispensable element of this principle is that the concentration of combat power at a specified objective is the sole responsibility of a subordinate commander equipped with the requisite forces and authority to accomplish the assigned mission.

Economy of force requires that "minimum means be

employed in areas other than where the main effort is intended to be employed."⁶² In essence, economy of force specifies that the commander must thoroughly analyze the battlefield and efficiently manage combat resources. Economy of force is particularly significant when a unit is ordered to fight a numerically superior enemy. It requires the commander to determine the most likely enemy action and to allocate or manipulate sufficient combat power at the appropriate place and time. It forces the commander to weight the main friendly effort while accepting risk in other less threatening areas. This manipulation of assets must be intensely managed and necessitates both efficient plans and organizational design. J.F.C. Fuller, when developing this principle, saw war as both a physical and psychological struggle to control and expend military force prudently and efficiently:

In the physical sphere we see this law (economy of force) in its most manifest form. The whole tendency of work and mechanical progress is towards economizing physical force. . . . To economize man's strength, to economize in life, by perfecting the means of war—that is, by rendering them more and more efficient—has been the law of mechanical progress in war. . . .

The principle of simplicity merely contends that both operational and tactical plans must be "clear and uncomplicated," and that orders are "concise to ensure thorough understanding."⁶⁴ Complicated plans are, for the most part, difficult to execute and may potentially increase the chances for confusion and uncertainty. In fact, complicated plans tend to significantly contribute to the "fog of war." Simple plans are easier to formulate, quicker to disseminate, more readily

synchronized and normally provide the subordinate commander more time to develop his own plan. Implied in this principle is that not only must plans and orders be kept simple, but also military organization and structure.

UNITY OF COMMAND

Effective application of the principle of unity of command at the tactical level requires the concentration of combat power focused against a common objective and unity of effort. Often, this success is achieved by "vesting a single commander with the requisite authority to direct and to coordinate all forces employed in pursuit of a common goal."⁶⁵ In essence, this principle requires that the maneuver commander must be provided the necessary forces and equipment to accomplish the mission of division-level reconnaissance. In relation to the ALBF reconnaissance design proposal and the principle of unity of command, it is preferable for one battalion-level commander and organization to execute the reconnaissance mission for the division. Inherent air and ground systems limitations require that the reconnaissance mission be orchestrated by one tactical commander. One unit can focus readily on the reconnaissance task rather than having attention divided between an assortment of possible missions. One division reconnaissance organization facilitates the development and implementation of combined aviation and ground unit reconnaissance doctrine, tactics and procedures.

The helicopter, though extending the surveillance range of the commander, cannot replace the capability

of ground reconnaissance systems. Information obtained by air will often become a start point from which other intelligence missions generate. In fact, current air reconnaissance forces simply provide a "quick look" function, are vulnerable to enemy deception efforts, require some level of ground-confirming detail and are perhaps a point of departure for more meticulous and thorough reconnaissance. For the present and immediate future, the helicopter is not fully capable of either limited visibility or continuous operations in adverse weather or terrain. Ground reconnaissance systems deliver an all-weather and sustained 24-hour potential for the maneuver commander, but are slow and cumbersome in comparison to the helicopter. When ground and air reconnaissance forces are tactically employed together, surveillance deficiencies in one system are compensated by the relative strengths of the other.⁶⁶ The full reconnaissance potential of the division commander can only be realized when the strengths of both aviation and ground assets are integrated under the control of one subordinate commander.

The mission of the ALBF aviation battalion is to conduct reconnaissance, general aviation support, limited air attack, and to assist the division in the integration of task-organized corps aviation assets.⁶⁷ This multiple mission perspective will make it increasingly difficult for the ALBF aviation battalion to concentrate solely on the reconnaissance task. Likewise, the increase in firepower gained by the addition of tanks into the ALBF cavalry squadron may

persuade or tempt the division commander to use the squadron in missions other than reconnaissance and security (attack, defend, economy of force, etc.). It is not suggested that this is necessarily wrong. Regardless of future doctrine or organizational structure considerations, the division commander will continue to shape the battlefield utilizing the factors of METT-T. What is suggested, however, is that the separation of the reconnaissance task into two distinct organizations, coupled with a multiple mission requirement, will complicate unity of effort and will make it much more difficult to focus exclusively on the reconnaissance mission.

The complexity of the ALBF reconnaissance design in relation to unity of effort/command becomes even more apparent as you attempt to delineate doctrinal accountability. Currently, the Armor Center is responsible for the development and assimilation of reconnaissance doctrine. Under ALBF proposals, doctrine development would become a dual responsibility for both the Aviation and Armor Centers. It could be argued that the ALBF proposal does not necessarily change the process of doctrine formulation. There has and will probably continue to be a close, habitual doctrinal and functional relationship between the two schools. Yet, the fact remains that solutions for current doctrinal reconnaissance disputes are now made by one TRADOC proponent. Under ALBF design, resolutions must be made by the TRADOC commander. One is forced to ask if the addition of another TRADOC doctrinal propo-

nent is worth the expense of a design that offers limited practical benefits for the ALBF division commander.

ECONOMY OF FORCE

In the absence of unlimited resources, economy of force operations obligate the commander to shape the battlefield by weighting his main effort with adequate power while accepting risk in other areas. The efficient manipulation of combat power requires the commander to have a thorough understanding and knowledge of the threat target array. Information-gathering systems are the means by which the division commander views and then conceptualizes the battlefield. Reconnaissance units are, in effect, intelligence-gathering systems and the division commander's directed telescope.

The proposed ALBF reconnaissance design is neither a practical nor an economic utilization of limited resources. First, during a period of military fiscal restraint, the expense of technology-enhanced reconnaissance systems requires their efficient employment and use. The proposed tactical employment of the ALBF division-level reconnaissance forces is not an economical utilization of limited assets. Second, the inherent equipment limitations of current and projected tactical reconnaissance platforms require their simultaneous employment in order to capture the full potential of the systems and organizations. In many anticipated tactical situations, the ALBF division

reconnaissance design would, in fact, require an unnecessary duplication of effort resulting in squandered resources.

The number of division-level reconnaissance units are few. The ALBF division commander will benefit from the enhanced surveillance capacity of product-improved battlefield sensors and electronic signal intelligence-gathering systems. The ability of the commander to focus combat power rapidly on the ALBF battlefield will be proportional to the capability of the intelligence systems to provide timely data. ALBF anticipates that technology will be available for the division commander to see the entire depth of the battlefield. Advance technology, in fact, is the ALBF reconnaissance panacea. Unfortunately, historical procurement and budgetary constraints do not necessarily support this assumption.

Reconnaissance success on the nonlinear battlefield will be accomplished only through the integration of all intelligence-gathering systems. Information sensors will identify and locate suspected targets while reconnaissance formations will confirm this acquired data. Similar to maneuver force constraints, the division commander has limited reconnaissance assets and must judiciously exercise their employment.

The ALBF design provides to the division commander the flexibility to employ either air or ground assets to collect and verify information. In effect, the commander can simultaneously focus his air assets in one area while ground forces are employed elsewhere. The concept appears ideal. Yet, in reality, it may

have serious flaws.

The ALBF cavalry squadron will be tasked an aviation battalion mission in the event that the aviation battalion is unable to execute its assigned task due to weather restrictions, terrain, limited visibility or a significant air defense threat. Also likely is the case that as ground reconnaissance forces become significantly slowed, more agile and mobile aviation forces may be required to accomplish a specific surveillance task. In either case, neither the ALBF cavalry squadron nor the aviation battalion commander will have the requisite reconnaissance systems flexibility to accomplish the mission. In order to resolve this ALBF dilemma, the division commander must reinforce either the cavalry squadron or the aviation battalion. To task-organize after initial mission failure requires internal coordination and time, and time is often the commander's least available resource.

The current "J" series cavalry squadron is a mobile, responsive, and agile combined arms team. Its most criticized weakness is a limited ability to fight for intelligence. ALBF design has remedied this structural flaw by allocating tanks to the squadron. Potentially, the unit can now gather information either by stealth or by fighting for intelligence. The helicopter provides the squadron commander the essential system to significantly increase his surveillance range at a moment's notice.

The potential strength of a cavalry squadron equipped with tanks, helicopters, and scout vehicles can provide the division a multifunctional organization

capable of continuous, all-weather operations. At his disposal, the squadron commander has agile systems that can gather information quickly and sufficient firepower to fight for information. One squadron commander controlling all division-level reconnaissance assets is better able to employ them economically than will two commanders or two staff officers (the division G2 and G3). The squadron commander, based upon the G2's intelligence estimate and the division commander's intent, is fully capable of synchronizing the division's reconnaissance and surveillance effort to confirm both electronic and sensor findings. Like the division commander, the squadron commander will assume risk in one area while weighting his main effort with requisite combat and surveillance forces.

SIMPLICITY

Perhaps more influential on the human or moral dimension of battle than the other principles of war, simplicity ensures that plans and instructions are easily understood and succinct. Simple plans and organizational structure promote ease of execution, especially as time progresses and battlefield fatigue becomes an inhibiting factor and detrimental to clear thinking. Complicated plans normally generate misunderstanding and promote uncertainty. Simplicity, on the other hand, stimulates comprehension and bolsters flexibility in the command. The proposed ALBF reconnaissance design violates the principle of simplicity for a multitude of reasons. First, the

division gains virtually no tactical reconnaissance advantage by the complex proposition of fragmenting the reconnaissance mission between two battalion-level formations. Second, although the ALBF structure may attempt to simplify inherent aviation and ground training and control challenges, it actually creates unnecessary wartime employment obstacles.

By design, either division-level ALBF reconnaissance organization can be expanded with sufficient equipment and personnel when the combined capabilities of both units are needed for mission accomplishment. Unfortunately, this idea is more complex than it appears. Once it is determined that to achieve mission success additional or unique systems are required to execute the reconnaissance task, a division-level task-organization decision must be made. This decision may require the ALBF cavalry squadron to be augmented with helicopters or the aviation battalion with ground assets. Regardless of the type of structure conclusion, the division decision and execution process will require both additional time and resources.

The current "J" series organization provides the squadron commander the flexibility and necessary structure to manipulate both forces and equipment based on the specific situation. Regardless of the improvements in sensor technology, battlefield information vital to the completion of the division plan will continue to be verified and confirmed in accordance with target priorities developed by the division staff. Often, a combined arms reconnaissance approach is required to satisfy this mission. Aerial reconnaissance units

training and fighting with their ground counterpart enhance command, control, and understanding of the battlefield by providing the commander a broad view of the zone of action. Also, the current structure permits the division to give mission-type orders to the unit, making it the squadron commander's responsibility to organize his assets.

The proposed ALBF reconnaissance design recognizes that it may become necessary to orchestrate the division reconnaissance effort by temporarily combining air with ground forces. ALBF resolution to a perceived aviation integration and planning problem is to supply the cavalry squadron with an aviation liaison and airspace management team.⁶⁸ Currently, the requisite aviation staff personnel are permanently assigned to the "J" series cavalry squadron. The original "J" series force design identified the requirement for an organic air space management team assigned to the squadron's operations section.

Due to the anticipated increased dimensions of the ALBF nonlinear battlefield, maneuver units can expect to have less contact with the division headquarters and will conduct more independent operations. Consequently, this factor requires a clear and concise intelligence product.⁶⁹ Also, since the ALBF division is essentially a command and control headquarters, the G2 will allocate reconnaissance and surveillance assets based on a combined staff METT-T analysis. Compared to the current structure, the proposed ALBF reconnaissance design may require more time for the ASPS to process information and develop a reasonably accurate

intelligence picture.

The ALBF cavalry squadron and the aviation battalion S2s study and analyze information received from both air and ground assets and provide the product of that analysis to the division ASPS. Uncertainty occurs as conflicting information is received by the ASPS from two reconnaissance organizations. Currently, the cavalry squadron S2 pieces together reconnaissance and surveillance information obtained from the combined effects of air and ground units. Through habitual training and practice the "J" series cavalry squadron S2 becomes familiar with air and ground reconnaissance systems capabilities. The result of this routine intelligence training association is a coherent reconnaissance picture that synthesizes the effects of ground and air systems.

Another innovation of the ALBF reconnaissance design is the formation of an additional battalion-level headquarters. The creation of the aviation battalion requires a command and control element for management and coordination. Normally, the introduction of a new subordinate unit to the division will provide added combat or support capabilities. This assumption is not necessarily true when examining the ALBF aviation battalion.

The ALBF aviation battalion is designed to furnish the division an "agile, lightened" unit, "to provide minimal essential organic aviation support."⁷⁰ The large battalion staff not only supports organic subordinate units but assists the division integrate corps-level aviation assets as they are task-organized

to the division. Discounting the helicopter airframes that are presently assigned to the "J" series cavalry squadron, the ALBF aviation battalion will be authorized only ten additional helicopters. The majority of the nonreconnaissance air systems are intended to be used for division-level command and control missions or for organic aviation battalion logistical support. In relation to the increased combat and reconnaissance potential of the two organizations, the net contribution of the ALBF aviation battalion compared to the current cavalry squadron is the creation of an additional battalion-level headquarters with its requisite administration and control attachments.

In reality, the Armor Center's recommendation to simplify perceived training and education challenges in the current design is to increase organizational structure. The "J" series division cavalry organization is genuinely a combined arms command. Few other battalion-level units are required to continuously synchronize the three-dimensional battlefield. Complicated reconnaissance systems, coupled with the wide dispersal of assigned forces, combine to test the span-of-control ability of the squadron commander. The ALBF proposed separation of the air and ground reconnaissance components may ease or simplify administration and logistic support burdens at the unit-level but may, in fact, create additional problems for the division in combined-arms training, coordination and complicate wartime employment.

This training issue is not new. Historically, the integration of air and ground forces into one recon-

naissance unit has always presented serious challenges. However, the remedy was to increase training and joint service cooperation.

The question that must be addressed concerning the role of the ALBF aviation battalion is if the requirement for the organization is worth the administrative and logistical cost? Granted, the unit may assist in simplifying some existing "J" series aviation training and sustainment issues and challenges. Yet, these ALBF advantages are shortsighted and are overwhelmed by the hurdles it creates. The creation of the aviation battalion will not simplify command and control or ease operations for the division commander or staff. The aviation battalion is one more organization that must be commanded and controlled by the division. The dynamic nature of the nonlinear battlefield may not provide nor allow the division commander the time to effectively manage numerous additional units. The question that still remains unanswered by the proposed ALBF design is whether the creation of the aviation battalion is a means to solve a training issue by expanded structure or a peacetime solution that may not succeed during war?

IX. CONCLUSIONS

The purpose of this monograph was to describe, analyze and evaluate the ALBF structural design for division-level reconnaissance and surveillance units. Examined specifically was the proposed ALBF division cavalry squadron and aviation battalion. Provided as a

point of departure for analytical discussion was classic reconnaissance theory, historical evidence that demonstrated both the tactical and operational reconnaissance linkage of air and ground units, and a brief discussion of the anticipated ALBF nonlinear battlefield.

Historically, the consolidation of air and ground assets into one unit to conduct division-level reconnaissance has caused considerable debate and resistance. In this paper I attempted to compare and contrast the advantages and disadvantages of the proposed ALBF separation of aviation and ground reconnaissance forces. Unfortunately, the suggested ALBF heavy division reconnaissance design will create more obstacles than it will solve.

There are some advantages, however, in separating air and ground reconnaissance forces. Analogous equipment eases maintenance, administration, and training responsibilities. Employment of each unique asset (air or ground) becomes simpler for the commander since fewer assets are managed or required. Nevertheless, these benefits are shortsighted and will not necessarily strengthen the general reconnaissance competence of the heavy division.

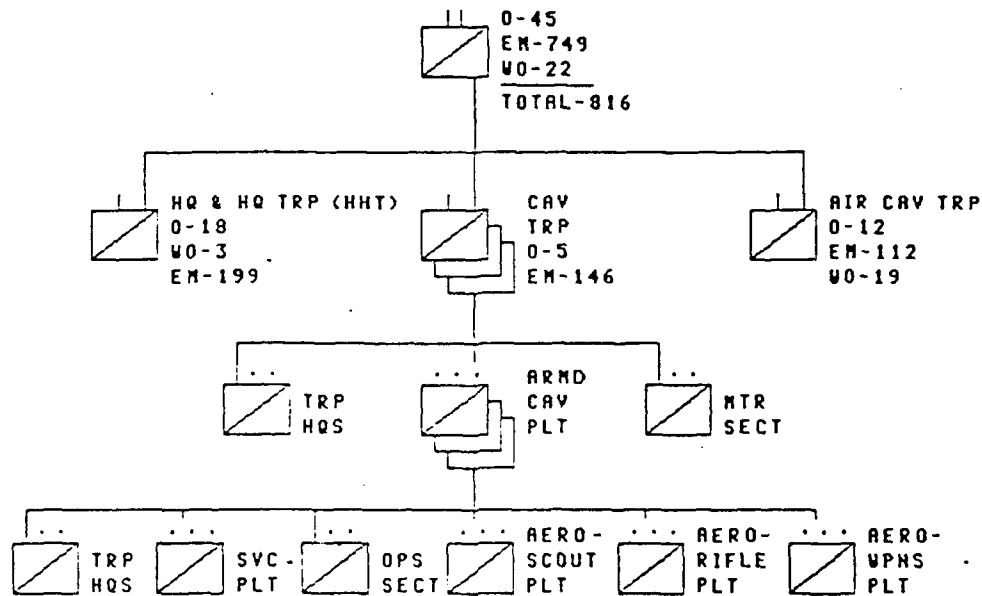
The disadvantages of the concept of an aviation battalion and a cavalry squadron conducting the division reconnaissance mission far outweigh the advantages. There are virtually no division reconnaissance potential enhancements provided by the proposal - only the creation of an unnecessary battalion headquarters

structure. In fact, reconnaissance coordination, command and control, and systems synchronization are strengthened with the present "J" series organization. Also, the habitual air-ground training and maneuver relationship is, if not lost entirely, seriously degraded by the ALBF recommendation.

The current division cavalry squadron commander is fully capable of maneuvering, training, and controlling both ground and air resources. Nonlinearity compounds the requirement for timely and accurate enemy intelligence. The ALBF divisional reconnaissance and surveillance systems must be capable of collecting and reporting information rapidly. The dynamic nature of ALBF demands that division-level reconnaissance be synchronized and manipulated by one consolidated maneuver headquarters. Well-trained and coordinated air and ground surveillance forces enhance rather than limit organizational and systems capabilities. ALBF division-level reconnaissance requirements are accomplished through training and not by the creation of another complex battalion-level organization. Peacetime solutions to real world training challenges normally disintegrate once the first bullet is fired.

ANNEX A

ARMORED CAVALRY SQUADRON TO&E 17-105E (JUNE 1964)



MAJOR EQUIPMENT ROLLUP¹ 'EVOLUTION'

UNIT	1964-E SERIES EQUIPMENT				
	TANK	APC	MORTAR	OBS HELD	UTIL HELD
HHT	-	6	-	-	-
CAV TRP X 3	6	23	3	-	-
AIR TRP	-	-	-	9	17
SQDN TOTAL	18	75	9	9	17

Source: Table of Organization & Equipment-17-105E, June 1964

ANNEX A
(CONL)

UNIT	1979-H SERIES EQUIPMENT					
	TANK	APC	MORTAR	OBS HELO	UTIL HELO	ATK HELO
HHT	-	6	-	-	-	-
CAV TRP X 3	12	17	3	-	-	-
AIR TRP	-	-	-	10	8	9
SQDN TOTAL	36	57	9	10	8	9

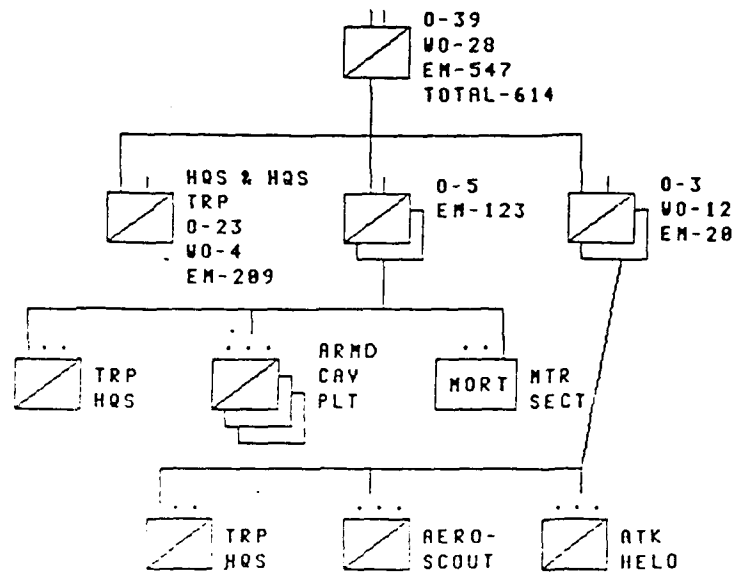
THE FUNDAMENTAL CONCEPTUAL DESIGN & MISSION FOCUS OF THE SQUADRON REMAINED CONSISTENT THROUGHOUT THE 1963-1984 PERIOD. BOTH PRODUCT IMPROVED & NEWLY DEVELOPED-EQUIPMENT WERE INTRODUCED AS VEHICLES AND HELICOPTERS BECAME OBSOLETE. SPECIFICALLY:

- A. OBSERVATION HELICOPTERS
SIOUX → OH-6 → OH-58
- B. ATTACK HELICOPTERS
UH-1B GUNSHIP → AH1 (COBRA)
- C. TANKS
M-41 → M551 → M60
- D. ARMORED PERSONNEL CARRIERS
M114 → M113

SOURCES: ARMOR REFERENCE DATA: JUNE 1964 & 1978-79
TABLE OF ORGANIZATION & EQUIPMENT - 17-105E
15 JULY 1963

ANNEX B

'J' SERIES T&E 1984



MAJOR EQUIPMENT ROLLUP

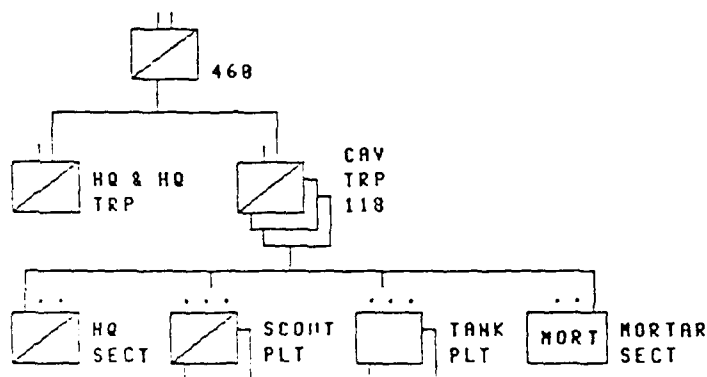
UNIT	EQUIPMENT			
	CFV ¹	ODS HELO	ATK HELO	UTIL HELO
HHT	2	6	4	1
CAV TRP X 2	19	-	-	-
AIR TRP X 2	-	-	-	-
SQDN TOTAL	40	12	8	1

¹CAVALRY FIGHTING VEHICLE

SOURCE: TABLE OF ORGANIZATION & EQUIPMENT - 17285J 410-1984

ANNEX C

ALBF DIVISION CAVALRY SQUADRON¹



MAJOR EQUIPMENT ROLLUP

UNIT	EQUIPMENT		
	TANK	CFV ²	MORTAR
HHT	-	3	-
CAV TRP X 3	9	18	3
SQDN TOTAL	27	33	6

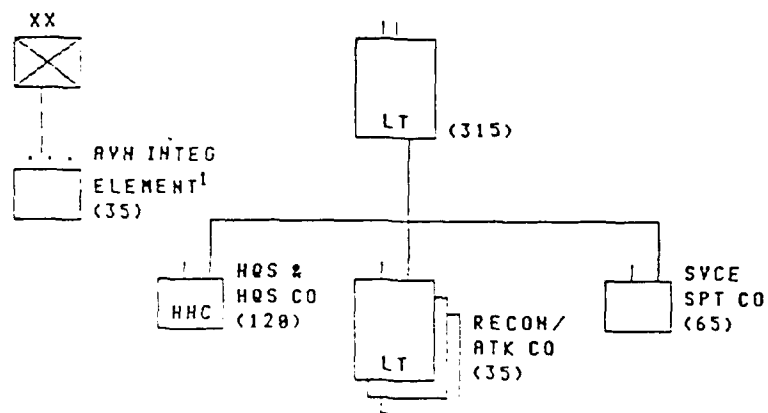
¹THE SQUADRON HEADQUARTERS CONTAINS AN AVIATION PLANNING CELL THAT INTEGRATES AVIATION W/GROUND ELEMENTS

²CAVALRY FIGHTING VEHICLE

SOURCE: 'ALBF' WHITE PAPER, COMBINED ARMS CENTER, FT. LEAVENWORTH, KS, 26 FEB 98 (REVISED BASE CASE, DIVISION CAVALRY SQUADRON) PG. VI-16

ANNEX D

ALBF DIVISION AVIATION BN



MAJOR EQUIPMENT ROLLUP

UNIT	EQUIPMENT		
	ATK HELO ²	UTIL HELO (LOG)	C ² HELO ³
HHC	1	3	—
RECON/ ATK CO	8	—	—
SYCE SPT CO	—	4	9
BH TOTAL	25	7	11

¹AVIATION INTEGRATION ELEMENT CONSISTS OF LIAISON OR A²C² TERMS TO THE DIVISION HQS. DIVISION CAVALRY SQUADRON AND SUPPORTED BDE HQS

²UH1/OH-59 ('J' SERIES) MIX IS REPLACED BY EITHER THE OH-58D OR THE LHX

³COMMAND & CONTROL HELICOPTER MAY BE UH-60 OR UH-1

SOURCE: 'ALBF' WHITE PAPER, COMBINED ARMS CENTER, FT. LEAVENWORTH, KS, 26 FEB 90 (REVISED BASE CASE, DIVISION AVIATION BN) PG. VI-35

ENDNOTES

- (1) Sun Tzu, The Art of War (New York, 1963), p. 84.
- (2) Major-General J.F.C. Fuller, Armored Warfare (Harrisburg, PA., 1951), p. 58,62.
- (3) Theodore Ropp, War in the Modern World (New York, New York, 1962), p. 13.
- (4) Richard P. Hallion, Strike From the Sky (Washington, D. C., 1989), p. 11.
- (5) Combined Arms Center, "AirLand Battle Future Alternative Base Study Phase I," (Ft. Leavenworth, Ks., 26 February 90), p. 1-1.
- (6) U.S. Army, Field Manual 17-95, Cavalry Operations (Washington, D.C., Feb. 86), p. 5-1.
- (7) Sun Tzu, p. 98.
- (8) Stackpole Books, Roots of Strategy, Volume 2 (Harrisburg, PA., 1987), p. 539-540.
- (9) Martin Van Creveld, Command in War (Cambridge, Mass., 1985), p. 8.
- (10) Carl Von Clausewitz, On War, trans. nd ed. by Micheal Howard and Peter Pare (Princeton, N.J., 1976), p. 117.
- (11) Hallion, p. 11.
- (12) Ibid, p. 15.
- (13) BG Billy Mitchell, Memoirs of WWI: From Start to Finish of our Greatest War (New York, N.Y., 1960), p. 236.
- (14) Hallion, p. 40.
- (15) Giulio Douhet, The Command of the Air, trans. by Dino Ferrari, ed. Richard H. Kohn and Joseph P. Harahan (Washington, D.C., 1983), p. 5.
- (16) General Von Seeckt, "The Aviator," Cavalry Journal (Ft. Knox., Ky., May-June, 1938). The statements of General Von Seeckt were reprinted in Armor Magazine (Ft. Knox., Ky., March-April, 1938), p. 33.
- (17) Paul Deichman, German Air Force Operations in Support of the Army (Maxwell AFB, Ala., 1962), p. 128.
- (18) I.D. White, "Reconnaissance Battalion, Armored Division," Cavalry Journal (Ft. Knox, Ky., Dec. 1931). GEN White's article was reprinted in Armor Magazine (Ft. Knox, Ky., Nov 1985), p. 76.

- (19) MG C.L. Scott, "Armored Reconnaissance," Cavalry Journal (Ft. Knox, Ky., Nov-Dec 1942), p. 16.
- (20) Israel Horowitz, "Air-Ground Cooperation," Cavalry Journal (Ft. Knox, Ky., Nov-Dec 1946), p. 46.
- (21) D.H. Cowles, "Ground School Demonstration On Air-Ground Cooperation," Cavalry Journal (Ft. Knox, Ky., April, 1936). Mr. Cowles' article was reprinted in Armor Magazine (Ft. Knox, Ky., Nov. 1985) pp. 30-31.
- (22) Grolier Inc., The New Book of Knowledge (New York, New York, 1979) p. 105
- (23) Donn Starry, Armored Combat in Vietnam (New York, N.Y., 1980), p. 50.
- (24) Mary Lee Stubbs and Stanley Russell Conner, Organization of the Armor And Cavalry (Washington, D.C., 1969), p. 83.
- (25) Ibid., p. 83
- (26) Shelby Stanton, "Lessons Learned or Lost: Air Cavalry and Airmobility," Military Review (Ft. Leavenworth, Ks., Jan. 1989), p. 75.
- (27) Ibid., p. 75.
- (28) Ibid., p. 76.
- (29) Stubbs and Conner, p. 83.
- (30) Ibid., p. 83.
- (31) Starry., p. 85.
- (32) Ibid., p. 221.
- (33) U.S. Army Field Manual 17-95, Cavalry Operations (Washington, D.C., 1977), p. i.
- (34) Robert P. Bush, "The Division Commander's Eyes and Ears," Armor Magazine (Ft Knox, Ky., Oct 1983), p. 14.
- (35) Ibid., p. 15.
- (36) CPT Donald C. Snedeker, "Mobility: The Key to Cavalry," Armor Magazine (Ft. Knox, Ky., Sept-Oct, 1974), p. 30.
- (37) MG George S. Patton, Jr. "Some Thoughts on Cavalry," Armor Magazine (Ft. Knox, Ky., May 1979), p. 28-29.
- (38) Combined Arms Center, "Concept for the Reorganization of Army Forces," ALBF White Paper (Ft. Leavenworth, Ks., 26 February, 1990), Pg I-1,2.
- (39) FM 100-5, p. 2.

- (40) Combined Arms Center, "Evolution of the Army, Using Insights From: AirLand Battle-Future," (Ft. Leavenworth, Ks., 11 September, 1990), p. ii.
- (41) Combined Arms Center, Nonlinear Considerations for AirLand Battle Future (Draft) (Ft. Leavenworth, Ks., 11 June, 1990), p. 5.
- (42) Combined Arms Center, "Evolution of the Army, Using Insights From: AirLand Battle Future," (Ft. Leavenworth, Ks., 11 September, 1990), p. 16.
- (43) Combined Arms Center, "AirLand Battle Future Alternate Base Case Study, Phase III," (Ft. Leavenworth, Ks., 19 April, 1990), p. XIII-1.
- (44) Combined Arms Center, "Evolution of the Army, Using Insights From: AirLand Battle Future," Ft. Leavenworth, Ks., 11 September, 1990), p. 20.
- (45) Ibid. p. 20.
- (46) Ibid. p. 21.
- (47) Ibid.. p. 22.
- (48) Ibid.. p. 24.
- (49) Ibid.. p. 25.
- (50) Combined Arms Center, "AirLand Battle Future Alternate Base Case Study, Phase IV," (Ft. Leavenworth, Ks., 4 June, 1990), p. V-2.
- (51) Combined Arms Center, "Evolution of the Army, Using Insights From: AirLand Battle Future," Ft. Leavenworth, Ks., 11 September, 1990), p. 23.
- (52) Combined Arms Center, "AirLand Battle Future Alternate Base Case Study, Phase I," (Ft. Leavenworth, Ks., 26 February, 1990), p. VI-34.
- (53) Ibid.. p. VI-14
- (54) Ibid.. p. VI-34
- (55) Combined Arms Center, "AirLand Battle Future Alternate Base Case Study, Phase II," (Ft. Leavenworth, Ks., 30 March, 1990), p. IV-B-8.
- (56) Director of Combat Development, United States Army Aviation Center, "Aviation White Paper," (Ft. Rucker, Al., 2 May 1990), pg. 31.
- (57) Directorate of Combat Developments, United States Army Armor Center, "AirLand Battle Future Issues White Paper," (Ft Knox, Ky., 3 May 1990) pg. 6.
- (58) Phone discussion (1530 hours, 6 August, 1990) with Mr. Charles Sheppard, Directorate of Combat Developments Office, U.S. Army Armor Center. Mr.

Sheppard is the principal Ft. Knox designer for ALBF. When asked by this author for a copy of the meeting minutes, agenda, or list of participants, Sheppard stated that the data was unavailable. Also, at the time of the interview, the ALBF division reconnaissance design has not been coordinated or discussed with units in the field.

(59) U.S. Army Field Manual 100-5 Operations (Washington, D.C., 5 May 1986), pg 173.

(60) Colonel J.F.C. Fuller, The Foundations of the Science of War. (London, 1925), p. 69.

(61) FM 100-5 (1986), pg. 175

(62) Ibid., pg. 177

(63) Ibid., pg. 175

(64) Colonel J.F.C. Fuller, The Foundations of the Science of War. (London, 1925), p. 206.

(65) FM 100-5 (1986), pg. 176.

(66) Bush., p. 16.

(67) Directorate of Combat Developments, U.S. Army Aviation Center, "Aviation Center White Paper," (Fort Rucker, Al. 2 May 1990), pg 14.

(68) Ibid., pg 14.

(69) Combined Arms Center, "AirLand Battle Future Alternate Base Case Study, Phase III," (Ft. Leavenworth Ks., 19 April 1990), pg. VIII-6.

(70) Directorate of Combat Developments, U.S. Army Aviation Center, "Aviation Center White Paper," (Fort Rucker, Al., 2 May 1990), pg 12.

BIBLIOGRAPHY

U.S. ARMY PUBLICATIONS

Armor Reference Data Pamphlet, "Armored Cavalry Squadron, Mechanized Division." Washington, D.C., June 1964, 1978-79.

Department of the Army, Field Manual 17-95, Cavalry Operations. Washington, D. C.; U.S. Government Printing Office, 1977 and 1986.

Department of the Army, Field Manual 71-100, Division Operations, Washington, D.C.; Government Printing Office, 6 June 1990.

Department of the Army, Field Manual 100-5, Operations. Washington, D.C.; U.S. Government Printing Office, 5 May 1986.

Department of the Army, Table of Organization and Equipment. Cavalry Squadron, Mechanized Division. TOE17-105E. Washington, D.C., 15 July 1963.

Department of the Army, Table of Organization and Equipment. Cavalry Squadron, Cavalry Brigade, Air Attack (Army of Excellence). TOE17205J410. Washington, D.C., 1 April 1984.

MILITARY DOCUMENTS.

Combat Development Study--Cavalry Study, Phase II. "The Heavy Division Cavalry Squadron." 25 April 1986.

Combined Arms Center. "AirLand Battle Future Alternate Base Case Study. Phase 1." Ft. Leavenworth, Kansas. 26 February, 1990.

Combined Arms Center. "AirLand Battle Future Alternate Base Case Study. Phase 2." Ft. Leavenworth, Kansas. 30 March 1990.

Combined Arms Center. "AirLand Battle Future Alternate Base Case Study. Phase 3." Ft. Leavenworth, Kansas. 19 April 1990.

Combined Arms Center. "AirLand Battle Future Alternate Base Case Study. Phase 4." Ft. Leavenworth, Kansas. 4 June 1990.

Combined Arms Center. "AirLand Battle Future Alternate Base Case Study. Phase 5." Ft. Leavenworth, Kansas. 18 June 1990.

Combined Arms Center. "Evolution of the Army, Using Insights From: AirLand Battle Future (Coordinating Draft)." Ft. Leavenworth, Kansas. 11 September. 1990.

Directorate of Combat Developments. "AirLand

Battle Future Issues White Paper." Ft. Knox, Kentucky.
3 May 1990.

Directorate of Combat Developments. "Aviation
Center White Paper. AirLand Battle Future." Fort
Rucker, Alabama. 2 May 1990.

Operational and Organizational Concept. "Division
and Corps 86 Cavalry." US Army Armor Center and Fort
Knox, 10 November 1980 DTIC AD-B053974

BOOKS

Berquist, Ronald E. The Role of Airpower in the
Iran-Iraq War. Maxwell AFB, Ala: Air University Press,
Dec. 1988.

Bradley, Omar N., A Soldier's Story, New York:
Holt, Rinehat and Winston.

Clausewitz, Carl Von. On War. Translated and
edited by Michael Howard and Peter Paret. Princeton:
Princeton University Press. 1976.

Creveld, Martin Van. Command in War. Harvard
University Press: Cambridge, Massachusetts. 1985.

Deichmann, Paul. German Air Force Operations in
Support of the Army. No. 163 in the USAF Historical
Studies series. Maxwell AFB, Ala: Air University, 1962.

Douhet, Giulio. The Command of the Air. Translated
by Dino Ferrari. Edited by Richard H. Kohn and Joseph
P. Harahan. Office of Air Force History: Washington,
D.C., 1983.

Fuller, Major-General J.F.C., Armored Warfare. The
Military Service Publishing Company, Harrisburg,
Pennsylvania, 1951.

Fuller, Colonel J.F.C., The Foundation of the
Science of War. Hutchinson and Company Ltd. London,
England, 1925.

Greefield, Kent Roberts. Army Ground Forces and
the Air-Ground Battle Team Including Organic Light
Aviation. Study No. 35 of the Series, Studies in the
History of Army Ground Forces. Washington, D.C.:
Historical Section, Army Ground Forces. 1948

Hallion, Richard P. Strike From the Sky.
Smithsonian Institution Press: Washington, D. C. 1989.

McDonald, William E. Tactical Air Recon.
Operations in Europe and North Africa. Air Command and
Staff College, Maxwell AFB, Ala. 1967

Miksche, F.O. Attack: A Study of Blitzkrieg
Tactics. New York: Random House. 1942.

Mitchell, BG William. Memoirs of World War I:

From Start to Finish of Our Greatest War. New York: Random House, 1960 ed.

Niehorster, Lee. World War II Organization and Equipment: Book 1, German Army Panzer and Panzergrenadier Divisions 1943-44. Brooklyn, NY: Enola Games, 1982.

Ropp, Theodore, War in the Modern World. Macmillan Publishing Company: New York, New York. 1962.

Stackpole Books, Roots of Strategy, Volume 2. Stackpole Books: Harrisburg, Pennsylvania. 1987.

Starry, GEN Donn A., Armored Combat in Vietnam. New York, N.Y.: Blandford Press, 1980.

Stubbs, Mary Lee and Stanley Russell Connor. Army Lineage Series: Armor-Cavalry, Part 1. Washington, DC: Office of the Chief of Military History, US Army, 1969

Sun Tzu, The Art of War. Translated by Samuel B. Griffith. Oxford University Press: Oxford, England. 1971.

Ziemke, Earl F., Stalingrad to Berlin: The German Defeat in the East. A volume in the Army Historical Series. Washington D.C.: Historical Division, Headquarters, USMC, 1949.

PERIODICALS AND ARTICLES

Baker, LTC Ronald "What in t Hell Did They do to the Cav.," U.S. Army War College. Carlisle, Pennsylvania, April 1983.

Blake, Major William B. "Missions and Techniques of Employment of Ground Armored Cavalry Units in Vietnam" Military Review. Ft. Leavenworth, Kansas. March 1973.

Brindle, LTC Harry C. "The 86th Cavalry Reconnaissance Squadron. Screening of the 6th Armored Division near Muhlhausen, April 5-12, 1945" The Armored Cavalry Journal. Ft. Knox, Kentucky. March-April 1946.

Bunce, SSG Peter L. "The Reconnaissance Dilemma," Armor Magazine. Ft. Knox., Kentucky. May-June 1985.

Bush, Robert P. "The Division Commander's Eyes and Ears." Armor Magazine. Ft. Knox, Kentucky. September-October 1983.

Coghlan, James "Air Reconnaissance Gathers Speed for the Air-Land Battle" Defense Electronics. Vol 18, September 1986.

Cowles, MAJ D.H. "Ground School Demonstration On Air-Ground Cooperation." Armor Magazine. (Reprint), Ft. Knox, Kentucky. May-June 1985.

Crouch, Col William W. "Soviet Reconnaissance Operations." Armor Magazine. Ft. Knox, Kentucky. November-December 1981.

Disney, Col Paul A. "Armored Cavalry of the Present--and Future." The Armored Cavalry Journal. Ft. Knox, Kentucky. January-February 1948.

Flannagan, MAJ Roy C. "The Air-Cavalry Team in Reconnaissance." The Cavalry Journal. Ft. Knox, Kentucky. July-August 1943.

Horowitz, Israel. "Air-Ground Cooperation." The Armored Cavalry Journal. Ft. Knox, Kentucky. November-December 1946.

Hulse, LTC Allen D. "Principles and Modern Methods of Reconnaissance." The Armored Cavalry Journal. Ft. Knox, Kentucky. July-August 1946.

Jackson, LTC Lawrence M. III, "Force Modernization--Doctrine, Organization, and Equipment." Military Review. Ft. Leavenworth, Kansas. December 1982.

Palmer, LTC Bruce J. Jr. "New Battle Lessons on Reconnaissance." The Cavalry Journal. Ft. Knox., Kentucky. September-October 1943.

Patton, MG George S. "Some Thoughts on Cavalry." Armor Magazine. Ft. Knox, Kentucky. June 1979.

Pitts, COL Frederick R. "The Armored Force-Air Team." The Cavalry Journal. Ft. Knox, Kentucky. November-December 1943.

Rosenberger, John D. and White, Thomas E. "Cavalry in the AirLand Battle." Armor Magazine. Ft. Knox, Kentucky. January-February 1986.

Rosenberg, LTC Ralph G. and MAJ Michael S. Lancaster. "Command and Control for the Division 86 Squadron." Military Review. Ft. Leavenworth, Kansas. November 1981.

Saint, LTG Crosbie E., and COL Walter H. Yates. Jr. "Attack Helicopter Operations in the AirLand Battle: Close Operations." Military Review. Ft. Leavenworth, Kansas. July, 1968.

Saint, COL Crosbie, "Cavalry Today." Armor Magazine. Ft. Knox., Kentucky. July-August, 1977.

Scott, MG C.L., "Armored Recon." The Cavalry Journal. Ft. Knox, Kentucky. November-December 1942.

Snedeker, CPT Donald C. "Mobility: The Key to Cavalry." Armored Magazine. Ft. Knox, Kentucky. September-October 1974.

Stanton, Shelby L. "Lessons Learned or Lost: Air

Cavalry and Airmobility." Military Review. Ft. Leavenworth, Kansas. January 1989.

Steward, MAJ Hal D. "Cavalry in World War II." The Armored Cavalry Journal. Ft. Knox, Kentucky. May-June 1946.

Starry, MG Donn A.. "The Commander's Hatch: Modern Armor Battle III-Cavalry." Armor Magazine. Ft. Knox, Kentucky. April 1975.

Villency, Charles. "The Gallant Little 'L' Plane." The Armored Cavalry Journal. Ft. Knox, Kentucky. September-October 1946.

White, MAJ I.D. "The Armored Force: Reconnaissance Battalion. Armored Division." The Cavalry Journal. Ft. Knox, Kentucky. May-June 1941.

Wyman, Michael C. "Aeroscout Observers Need Better Training." U.S. Army Aviation Digest. Ft. Rucker, Alabama. January 1984.

STUDENT MONOGRAPHS AND THESES

Bryant, Allen. "Blindman's Bluff: A Look at Tactical Reconnaissance Capabilities." School for Advance Military Studies Student Monograph. Ft. Leavenworth, Kansas. December 1987.

Diehl, Major James G. "Who is Out There? Tactical Reconnaissance Formations for the Heavy Division" School of Advanced Military Studies Student Monograph. Ft. Leavenworth, Kansas. December 1988.

Kindvatter, Major Peter S. "The AOE Divisional Cavalry Squadron--A Doctrinal Step Backward?" School of Advanced Military Studies Student Monograph. Ft. Leavenworth, Kansas. December 1985.

Quinlan, Major Kenneth J. "The Army-of-Excellence Divisional Cavalry Squadron" School of Advanced Military Studies Student Monograph. Ft. Leavenworth, Kansas. January, 1986.

Wolf, Major James R.. "Ground Reconnaissance in the Heavy Corps." School of Advanced Military Studies Student Monograph, Ft. Leavenworth, Kansas. November. 1988.